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How Hybrid Cloud Success Starts with On-premises Server Infrastructure

Research Exploring the Impact Servers Have on Cloud Migrations, Data Center Spending, and the Effectiveness of a Hybrid Cloud

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Executive Summary

The rise of the digital economy and multi-cloud IT requires organizations to decide how to best leverage their infrastructure resources to fulfill business requirements while securing their data and applications. As organizations adopt public cloud services, some treat it as a completely separate activity—in other words, acting on the belief that on-premises design decisions, specifically around server technology, have no impact on how their organization leverages public cloud. ESG research reveals otherwise.

A recent ESG survey explored differences between modern server infrastructures (i.e., those comparable to or better than public cloud in compute alternatives in areas like cost effectiveness, performance, scalability, time to deploy, etc.) and traditional (legacy) server infrastructures. It revealed several compelling advantages of modern servers that empower hybrid cloud deployments, including:

- With modern servers, public cloud migrations are ahead of schedule 1.6x more often.

- With modern servers, public cloud migrations are under budget 1.4x more often.

- Modern server environments experience a 22% decrease in on-premises data center spending relative to more traditional server environments, freeing resources for other projects.

- 90% of modern server environment operators report increased value/effectiveness from hybrid cloud initiatives versus just 62% of those running legacy server shops.

- 52% of modern server environment operators are very confident when achieving hybrid cloud goals versus 25% of those using legacy servers.

Introduction

The digital economy has established a critical role for data *and* the applications that extract value from data. The combination of the two have become possibly the most important and most valuable business assets. Data drives business, plain and simple, and smart organizations view data as a way to differentiate in their markets and stay competitive, whether it is offering more custom services to their customers, or ideating new product and services. IT organizations undertake various efforts to maximize the value of their data and their applications, including leveraging and integrating a variety of diverse infrastructure resources—most notably public cloud services—while also evaluating several emerging application deployment models, such as container-based or serverless.

The ultimate goal of infrastructure design, however, is the construction and delivery of a consistent hybrid cloud infrastructure, in which organizations can reap the benefits of cloud at scale with a "best-of-both-worlds" approach suited to both current and future workloads. Hybrid cloud environments, in which some apps and workloads reside on-premises and others reside on public cloud infrastructure, founded upon modern servers, provide superior agility, scalability, and integrated security, with automated management and configurability.

In this hybrid cloud era, deployment locale is a crucial decision for both data and applications due to management, security, and cost implications:

- Not all decisions about where to put data and applications are obvious, and factors change over time.

- Compliance and regulations that dictate where a workload or data resides often change as the global economy shifts and evolves.

- The increased value of data brings cybersecurity to the forefront of nearly all IT decisions.

- Data is "heavy," and moving applications using traditional technologies is consequential and often costly.

Can leveraging modern server technologies that often offer improvements to security, performance, and manageability so that data and applications can be moved more easily between private *and* public cloud environments based on workload and business requirements improve hybrid cloud environments? To answer this question, ESG conducted research in partnership with Dell EMC, VMware, and Intel Corporation. The study involved 1,257 IT infrastructure decision makers and line-of-business decision makers in enterprise and midmarket organizations located in North America, Europe, Asia-Pacific, and Latin America.

To optimize data and application movement in hybrid cloud environments, Dell EMC advocates modern, secure, cloud-enabled server solutions that provide fast, secure data management from core through edge to cloud, automated insights, and simplified manageability regardless of where workloads reside. This approach can expedite public cloud migrations, reduce their cost, improve overall IT efficiency, and free capital IT budget.

The 'Sprawl' Challenge: Today's Fragmented Modern IT Ecosystem

Multi-cloud IT is complex, pervasive, and increasing. The growth in cloud and cloud service provider (CSP) adoption will increase infrastructure sprawl, the risk of lock-in, and the challenges of managing data and applications—a potentially worrisome direction for IT staff who wonder if they can stay on top of all the moving parts.

Figure 1 highlights the high percentage of users today, as well as the trend toward more clouds and a more widely distributed infrastructure environment instead of toward consolidation. Several key takeaways include:

- 82% use multiple infrastructure CSPs today.

- 86% expect to use multiple infrastructure CSPs in three years.

- The percentage of IT providers using four or more CSPs is expected to double (31% versus 15%) in three years.

Figure 1. Multi-cloud IT Is Pervasive and Increasing

Approximately how many unique public cloud infrastructure (IaaS, PaaS, CaaS) service providers does your organization currently use? How many do you expect to use 36 months from now? (Percent of respondents, N=1,257)

■ Public cloud service providers used today
■ Number of public cloud service providers expected to be used 36 months from now

	1	2	3	4 to 5	More than 5
Used today	18%	40%	28%	10%	5%
36 months from now	14%	25%	30%	20%	11%
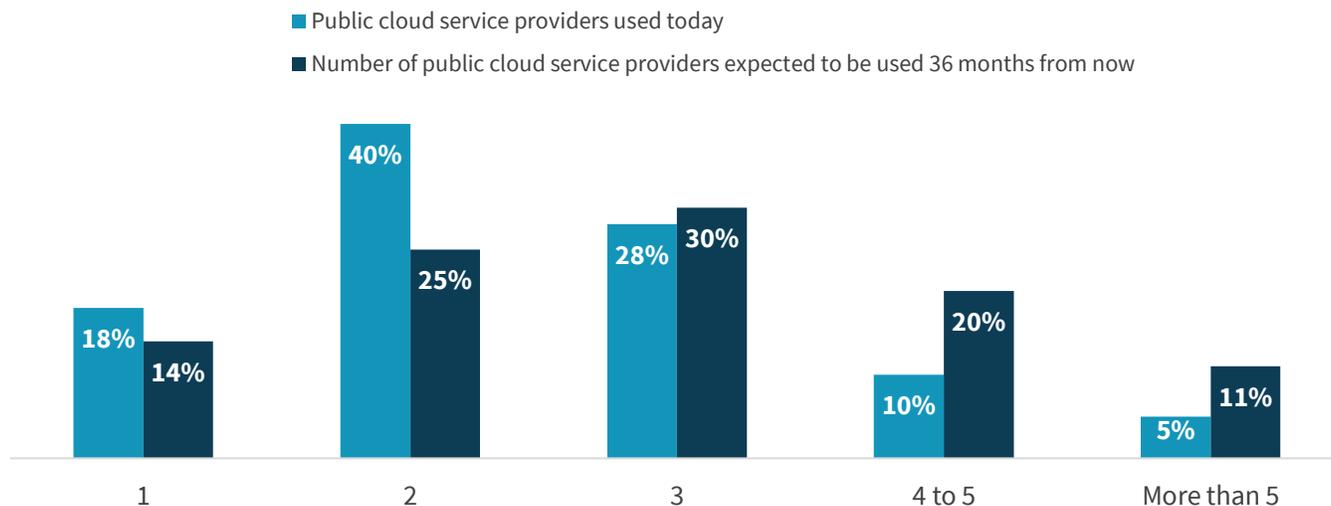
Source: Enterprise Strategy Group

The integration of public clouds can offer benefits related to speed and flexibility of infrastructure deployment, but these capabilities are not risk free. Data is arguably a company's most important asset, and a core component of an IT administrator's job is minimizing business risk. As a result, survey respondents have some reservations (see Figure 2):

- Nearly 9 out of 10 respondents had some concern over moving data and applications to public cloud infrastructure.

- 58% identified concerns over data protection and security.

- 52% identified concerns over the ongoing costs.

- 45% identified concerns about lock-in.

Figure 2. Application- and Data-related Concerns Emerge with Cloud Adoption

As more of your organization's data moves to public cloud infrastructure, which of the following concerns do you have (if any)? (Percent of respondents, N=1,007, multiple responses accepted)

Concerns about our ability to protect and secure data	58%
Concerns about the escalating ongoing costs	52%
Concerns about lock-in	45%
I do not have any concerns with long-term storage of data in the cloud	11%
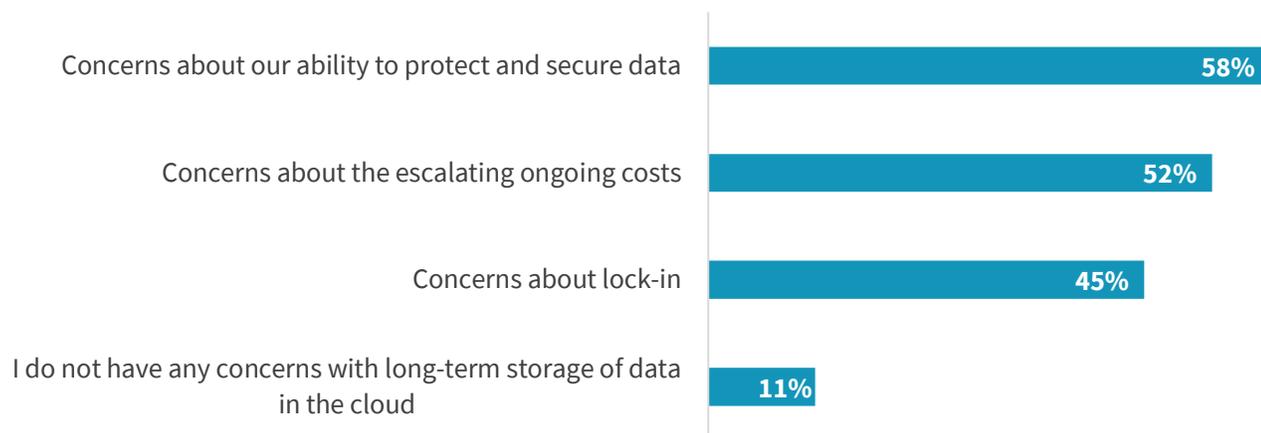
Source: Enterprise Strategy Group

Application infrastructures must be secure and optimized in a hybrid cloud environment, but this is easier said than done. For example, there may be confusion about the roles and responsibilities of public cloud users and CSPs. It is not always clear who owns what and who protects what. Some users assume that CSPs provide the necessary security to protect workloads, which may not be true. Most CSPs require a shared responsibility contract, which few organizations may fully probe or understand; often customers assume, incorrectly, that their CSP is taking care of essential functionality including network configuration, security, and identity and data protection. When security gaps exist, data and applications are at risk. Clarify roles and responsibilities at the outset to address any concerns, even though this effort takes time and may temporarily complicate cloud adoption and use.

Additionally, concerns over the risk of cloud provider lock-in are well-founded, especially if selecting proprietary compute platforms or heavily leveraging specialized cloud servcies to support developed applications. Leveraging more specialized or custom cloud services and infrastructrue has implications and may create pain longer term if the need to shift providers arises.

Application Deployment Choice and Flexibility Are Essential for Modern IT

Modern enterprises strive to move data and applications easily between private and public cloud environments. IT staffs need to respond quickly when conditions or requirements change and put workloads where they need to go. If it is difficult to move workloads, it is difficult to leverage infrastructure resources efficiently and cost effectively. ESG research revealed that 83% of organizations make workload placement flexibility a top-five priority among all technology initiatives (see Figure 3).

Figure 3. IT Organizations Prioritize Flexibility and Choice for Workload Placement

With respect to other technology initiatives, how important is it for your organization to enable choice in workload placement (i.e., to enable your organization to run workloads on whatever cloud, on- or off-premises, it wants)? (Percent of respondents, 1,257)

Not among our top 10 priorities, 2%

One of our top 10 priorities, 15%

Our most important priority, 27%

83% of organizations make achieving workload placement flexibility a top-5 priority among all technology initiatives.

One of our top 5 priorities, 56%
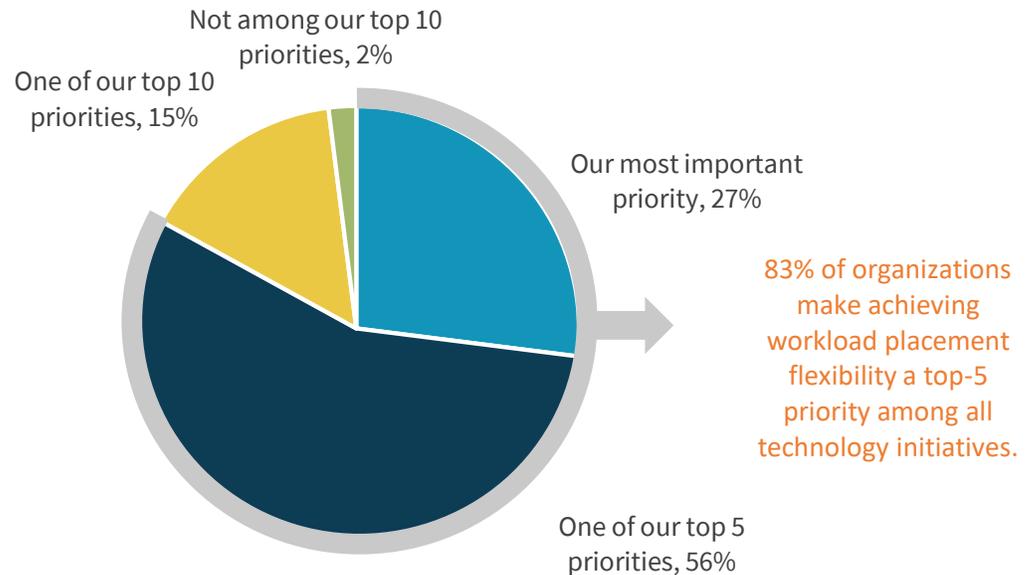
Source: Enterprise Strategy Group

Workload Repatriation: A Regular Practice in Modern IT

The rise in workload repatriation is a clear example of the need for deployment flexibility. According to survey results, 77% of IT organizations have moved at least one workload back on-premises due to a previously unforeseen challenge or satisfaction issue.

This action is not specific to only a handful of workloads: The survey shows that the likelihood that a workload will have to be repatriated is relatively consistent, ranging from a 20% to 30% chance, regardless of the workload type. The following examples were reported by organizations that had deployed specific applications in the cloud (not all users in the study):

- 27% pulled back supply chain management applications.

- 25% pulled back customer relationship management applications.

- 24% pulled back enterprise resource planning applications.

Even among emergent workloads, the percentages were largely consistent:

- 25% pulled back a machine learning workload.

- 24% pulled back their data lake environments.

- 23% pulled back big data analytics workloads.

- 21% pulled back deep learning workloads.

The pull-back ratios do not mean the cloud is bad. They simply underscore the importance of flexibility and choice. Many factors influence cloud repatriation. One common driver the research uncovered is that costs often play a role in these decisions (32%). Often times this is due to cloud economics breaking down over time as workloads and data sets scale. Security and regulatory requirements also often weigh on these decisions (cited by 32% and 25% of respondents, respectively). And while less common, performance sometimes plays a role, with scalability challenges (27%) and subpar performance (22%) both registering with a material proportion of respondents (see Figure 4).

Figure 4. Reasons Organizations Repatriate Public Cloud Workloads

Which of the following led your organization to move workloads running on cloud infrastructure back on-premises? (Percent of respondents, N=875, multiple responses accepted)

Reason	Percent
Difficulty implementing security measures	32%
Cost(s) exceeded expectations	32%
Unpredictable costs	29%
Limited access to new technologies	29%
Inability to support scalability requirements	27%
Difficulty providing adequate protection of applications or data	26%
Inability to meet availability expectations	26%
Experienced a security breach/incident	26%
Inability to meet functionality or usability expectations	25%
Difficulty maintaining or proving compliance	25%
Inability to meet elasticity expectations	24%
Poor or unpredictable application performance	22%

Source: Enterprise Strategy Group

The fact that the ratios are similar across varied applications points to persistent complexity in application and data movements to the cloud, regardless of the application. What is the best way to deliver deployment flexibility for applications? Complete the upfront work to understand the risk, then leverage technologies that ease movement when it occurs.

The Connection Between Modern Server Infrastructure and the Cloud

A common but incorrect assumption is that on-premises servers have little or no impact on public cloud deployments. Cloud adoption may appear to be a separate, disparate activity that is unaffected by the on-premises compute infrastructure. This is not the case. ESG research identified a powerful connection that has notable implications for multi-cloud environments.

Understanding how cloud projects are impacted by on-premises server technologies depends on first understanding the differences between modern servers and legacy servers. Survey participants were asked to compare their on-premises server environment to that of their public cloud compute environment (see Figure 5). Organizations that have an on-premises server environment comparable to or better than public cloud in eight or more of the following attributes were defined as having a modern server environment: cost effectiveness, performance, scalability, time to deploy, total cost of ownership, integrated/native security capabilities, simplified management, workload provisioning efficiency, automation/intelligent automation, and compatibility with containerization technologies.

Figure 5. Identifying Modern Server Infrastructure Environments

Which of the following on-premises server environment characteristics would you say are comparable to or better than those available in public cloud services? (Percent of respondents, N=1,257)

Modern Server Environments

Comparable or better than cloud in 8+ attributes, 6%

Comparable or better than cloud in 0-1 attributes, 12%

Comparable or better than cloud in 2-7 attributes, 81%
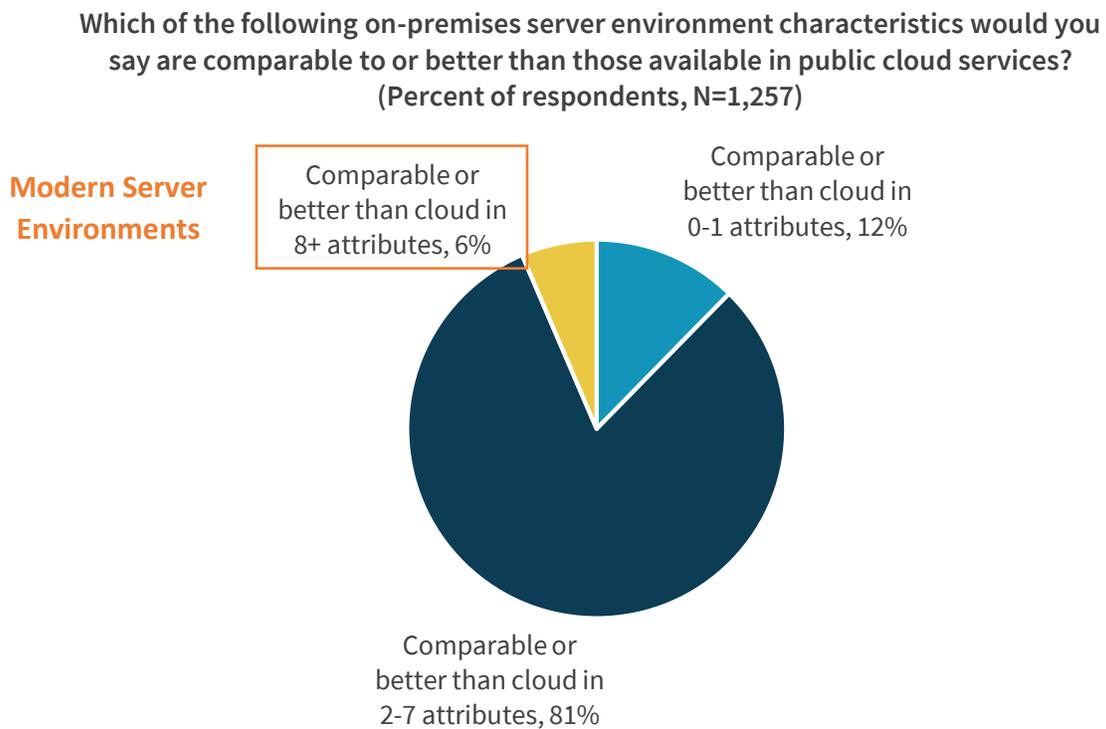
Source: Enterprise Strategy Group

The research validates several benefits of leveraging modern server technologies. Respondents who identified as having modern server environments went on to clarify the connections between on-premises technology and the cloud: higher likelihood of completing cloud projects ahead of schedule and under budget.

Figure 6 provides insights into public cloud migration and development scheduling:

- 32% were completed ahead of schedule in modern server shops.

- 20% were completed ahead of schedule in legacy server environments.

The 60% increase in projects completed ahead of schedule tracks with cost savings. Figure 6 confirms that in modern server shops, 24% of projects came in under budget—compared with 17% in legacy server shops. The difference in percentages translates into a 1.4x increase in "under-budget" success using modern servers.

Figure 6. Public Cloud Migrations Ahead of Schedule 1.6x More Often with Modern Servers

Please consider the public cloud migrations and development projects your organization has undertaken to date. Roughly what percent of these projects have been completed in each of the following timeframes? (Percent of respondents, by on-premises server environment)

■ Modern Server Shops (N=79)　■ Legacy Server Shops (N=141)

	Behind schedule	On schedule	Ahead of schedule
Modern Server Shops	31%	38%	32%
Legacy Server Shops	33%	47%	20%
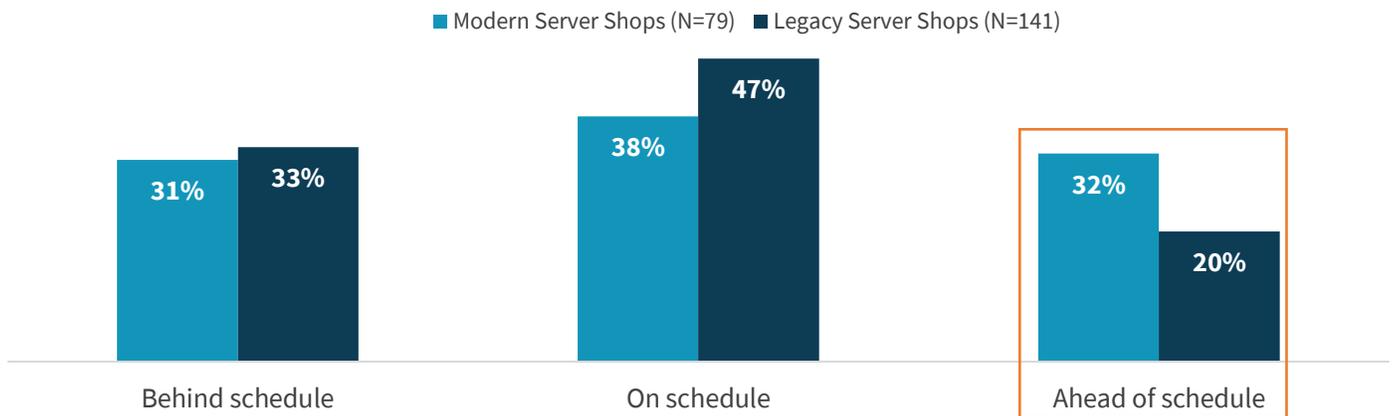
Source: Enterprise Strategy Group

Figure 7. Public Cloud Migrations Are Under Budget 1.4x More Often with Modern Servers

Please consider the public cloud migrations and development projects your organization has undertaken to date. Roughly what percent of these projects have been completed under, on, or over budget? (Percent of respondents, by on-premises server environment)

■ Modern Server Shops (N=79)　■ Legacy Server Shops (N=141)

	Over budget	On budget	Under budget
Modern Server Shops	36%	40%	24%
Legacy Server Shops	38%	45%	17%
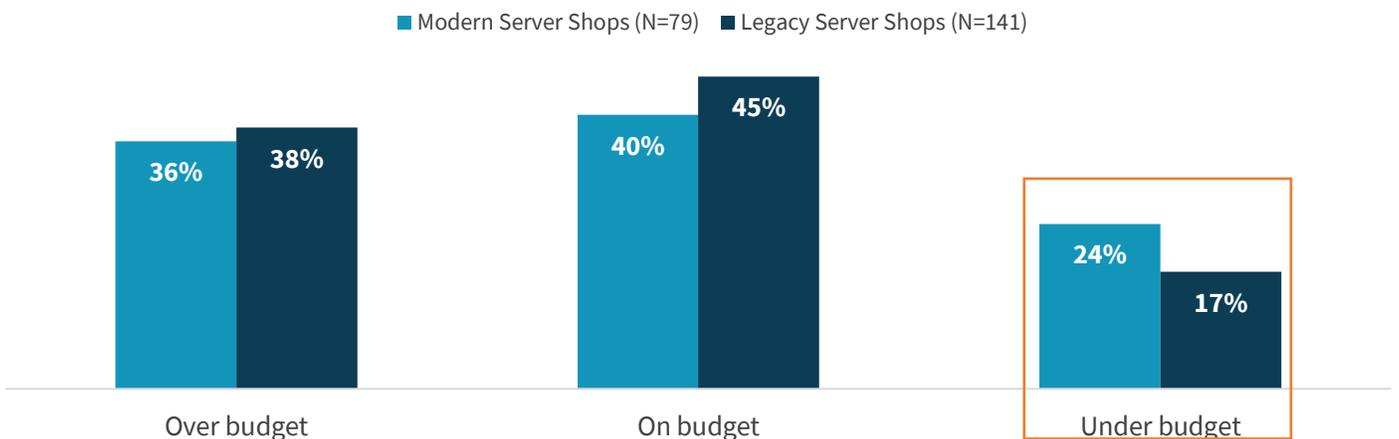
Source: Enterprise Strategy Group

Modern Servers Reduce CapEx and Make Hybrid Cloud Initiatives More Effective

Modern servers do more than help organizations complete projects ahead of schedule and under budget. The economic story gets better. Cloud projects are only one of an IT organization's responsibilities, and IT must deliver many IT services more quickly and more economically. Modern server technology helps IT organizations do this.

Figure 8 reports a compelling finding: IT organizations with modern servers allocated 22% less of their budget to on-premises data center infrastructure, freeing up resources for other assets and projects (24% versus 31%). Why? One way to look at this data as an end-user is to consider that if you have a solid, optimized server environment, you do not have to throw money at updating or upgrading it. The environment is also less time-consuming to manage. That is all part of why we see these organizations having to allocate 7% less of their budget to on-prem infrastructure. Based on previous ESG research, the average enterprise's annual IT budget is approximately US$167M.[1] The opportunity to reallocate 7% of the IT budget (or nearly US$12M for the average enterprise) to more strategic projects can have a very big impact.

According to survey respondents, this cost efficiency goes hand in hand with improved effectiveness: 90% of IT organizations with modern server environments report they are effective or very effective at driving value with hybrid cloud initiatives versus just 62% of legacy server environments (see Figure 9).

Figure 8. Modern Servers Free Up On-prem Investment Dollars

Approximately what percentage of your organization's total 2020 hardware and software budget will be allocated to each the following categories? (Mean)

Modern Server Shops (N=81):
- Cloud infrastructure (i.e., IaaS, PaaS, CaaS), 28%
- Cloud applications (i.e., SaaS), 26%
- On-premises business application software, 22%
- On-premises data center infrastructure, 24%

Legacy Server Shops (N=155):
- Cloud infrastructure (i.e., IaaS, PaaS, CaaS), 26%
- Cloud applications (i.e., SaaS), 24%
- On-premises business application software, 19%
- On-premises data center infrastructure, 31%

22% Reduction

Source: Enterprise Strategy Group

[1] Source: ESG Master Survey Results, *2020 Technology Spending Intentions Survey*, January 2020.

Figure 9. Hybrid Cloud Initiatives Are More Effective with Modern Server Infrastructure

Generally speaking, how effective would you say your organization's hybrid cloud initiatives have been at driving value for the organization? (Percent of respondents, by on-premises server environment)

■ Modern Server Shops (N=81)   ■ Legacy Server Shops (N=155)
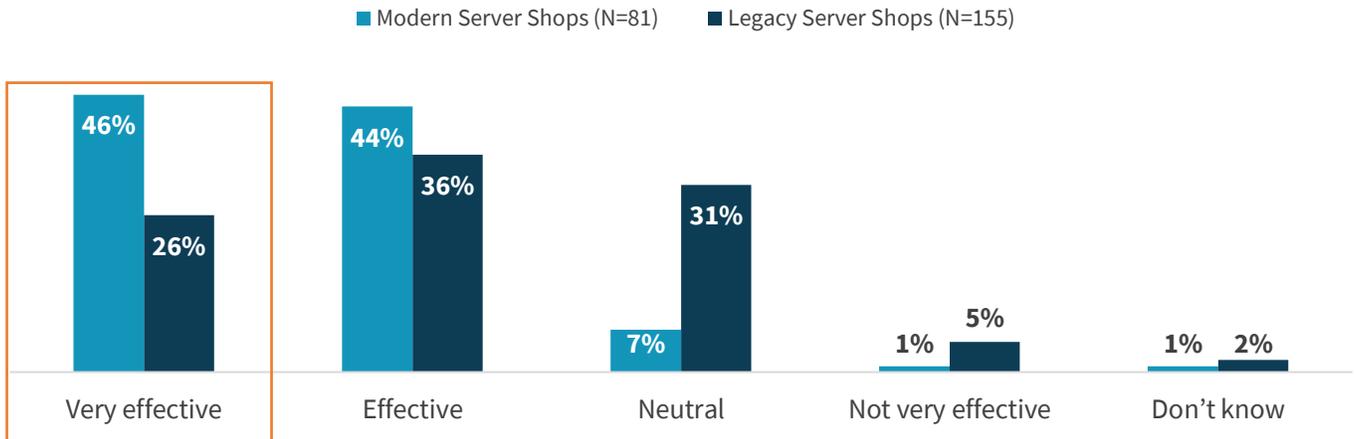
Source: Enterprise Strategy Group

The combination of savings and the perception of value received helps IT decision makers feel more confident in the successful outcome of hybrid cloud projects. Success today builds confidence for the future—a statement affirmed by survey results. IT organizations with modern server environments are 2.1x as likely to be very confident in their abilities to support future hybrid cloud goals (see Figure 10).

Figure 10. Modern Servers Fuel Confidence in Achieving Hybrid Cloud Goals

How confident are you that your IT organization will be able to support your business's goals for hybrid cloud over the next 36 months? (Percent of respondents, by on-premises server environment)

■ Modern Server Shops (N=81)   ■ Legacy Server Shops (N=155)
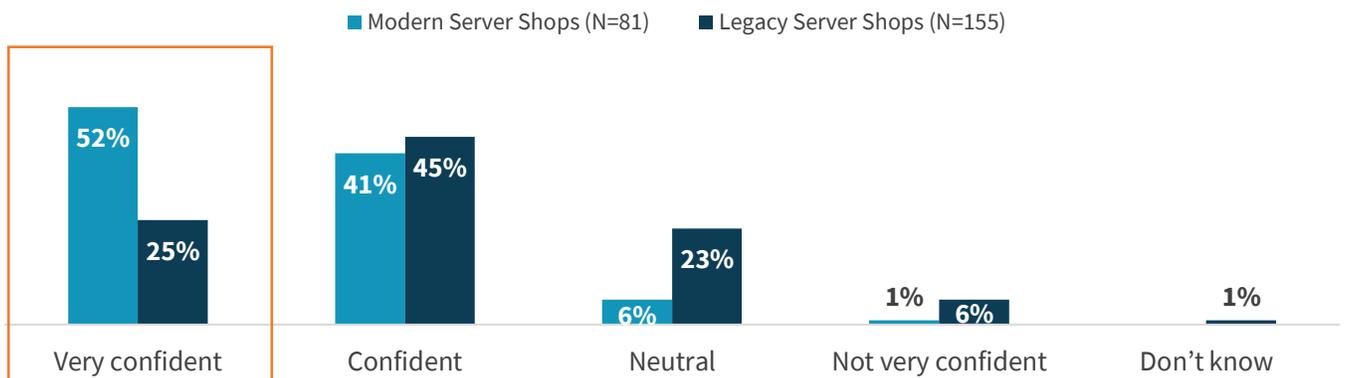
Source: Enterprise Strategy Group

Confidence in achieving hybrid cloud goals also is important in the context of workload placement. Organizations with modern server environments are 25% more likely (74% versus 59% of legacy server shops) to have repatriated a mission-critical workload from the public cloud to run it on-premises. In these cases, the improved capabilities of modern server environments likely made the on-premises infrastructure more attractive, which prompted movement to the more

advantageous infrastructure option. The need for innovation (in the form of reducing product cycle times, developing new offerings for the market faster, and pushing software releases to production more frequently) will continue to shift the infrastructure balance between on- and off-premises options. As options evolve, businesses that can more easily migrate workloads across a hybrid cloud environment will be better positioned to maximize the value of their data and applications to achieve their business goals.

The Role of Modern Server Infrastructure in Hybrid Cloud Success

Is a modern server infrastructure the driving element improving the hybrid cloud experience, or is it simply correlated to a better hybrid cloud? In other words, is it the on-premises server technology that makes the difference, or are organizations that are better at leveraging the cloud drawn to more modern server technologies, likely due to the increased value they place upon their data?

The reality might be a mixture of both, but a strong case can be made for modern servers having a direct impact on hybrid cloud success based on:

- Attributes, often bolstered by innovation, such as cost, performance, scalability, efficiency, integrated security, simplified management, and intelligent automation.

- Tangible benefits such as greater flexibility, ahead-of-schedule public cloud migrations, projects completed under budget, reduced time to market, and CapEx reduction.

- Respondent claims that their hybrid cloud initiatives are effective in driving value and increasing confidence.

The Bigger Truth

IT organizations must leverage diverse infrastructure resources, including public cloud, to compete effectively in the digital economy. Doing this, while protecting data and applications, is not a simple task. But organizations that have modern server technology on-premises are well positioned to succeed with hybrid cloud initiatives.

The right modern servers offer the flexibility, security, and efficiency that matter most in fluid situations in which resources need to be continually optimized. The connection between modern server infrastructure and public cloud deployments is firmly established by the following research findings:

- IT organizations with modern server environments report a **41% increase in the number of cloud projects completed under budget.**

- IT organizations with modern server environments report a **60% increase in the number of cloud projects completed ahead of schedule.**

- IT organizations with modern server environments were able to **reduce expected on-premises data center infrastructure spending by 22%.**

- 90% of IT organizations with modern server environments report they are **effective or very effective at driving value with hybrid cloud initiatives.**

How Dell Technologies Can Help

This ESG Research Insights Paper was commissioned by Dell Technologies, VMware, and Intel Corporation, all of which are keenly focused on helping organizations achieve their cloud goals.

Together, Dell Technologies, VMWare, and Intel Corporation are driving innovation and next-generation capabilities with the broadest portfolio of trusted infrastructure and cloud solutions. This comprehensive portfolio of hardware, software, and services enables organizations to easily adopt transformative technologies to maximize performance, compete, and thrive in the new digital economy.

The Dell EMC PowerEdge portfolio of rack, tower, and modular servers are cloud-ready solutions that help customers transform their data centers to enable greater operational efficiency, resiliency, and scalability throughout the entire cloud infrastructure. Additionally, Dell Technologies on Demand delivers the industry's broadest end-to-end portfolio of consumption-based and as-a-service solutions ideally suited for the way on-premises infrastructure and services are consumed in the on-demand economy.

To learn more about Dell EMC PowerEdge Servers for Hybrid Cloud IT, start here.

Appendix – Research Methodology and Respondent Demographics

To gather data for this report, ESG conducted a comprehensive online survey of IT decision makers from private- and public-sector organizations in 11 countries: US (33%), Canada (4%), UK (13%), France (9%), Germany (7%), Singapore (5%), Australia (5%), India (4%), Hong Kong (3%), Brazil (8%), and Mexico (8%). The survey was fielded between September 17, 2019 and October 12, 2019. To qualify for this survey, respondents were required to have influence in the purchase of cloud investments (public or private) at organizations utilizing public cloud infrastructure and operating modernized on-premises data center environments.

After filtering out unqualified respondents, removing duplicate responses, and screening the remaining completed responses (on several criteria) for data integrity, a final sample of 1,257 respondents remained.

All respondents were provided an incentive to complete the survey in the form of cash awards and/or cash equivalents. Note: Totals in figures and tables throughout this report may not add up to 100% due to rounding.

The figures below detail the demographics of the respondent base: individual respondents' current job responsibilities, as well as respondent organizations' total number of employees and primary industry.

Figure 11. Survey Respondents, by Job Title/Level

Which of the following best describes your current job title/level? (Percent of respondents, N=1,257)
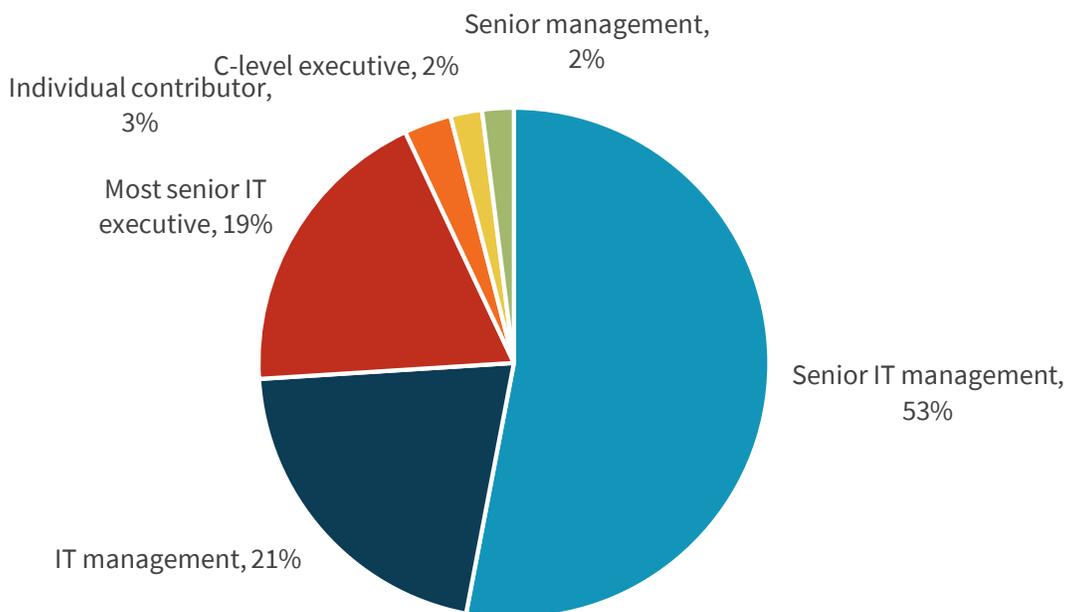
Source: Enterprise Strategy Group

Figure 12. Survey Respondents, by IT Responsibility Areas

In which of the following areas of IT do you have significant involvement in the purchase process for your company? (Percent of respondents, N=1,257, multiple responses accepted)

Area	Percent
Public cloud	87%
Virtualization/private cloud	82%
Data center infrastructure	81%
Cybersecurity/information security	78%
Endpoint devices	69%
Analytics/business intelligence	67%
Enterprise applications	66%
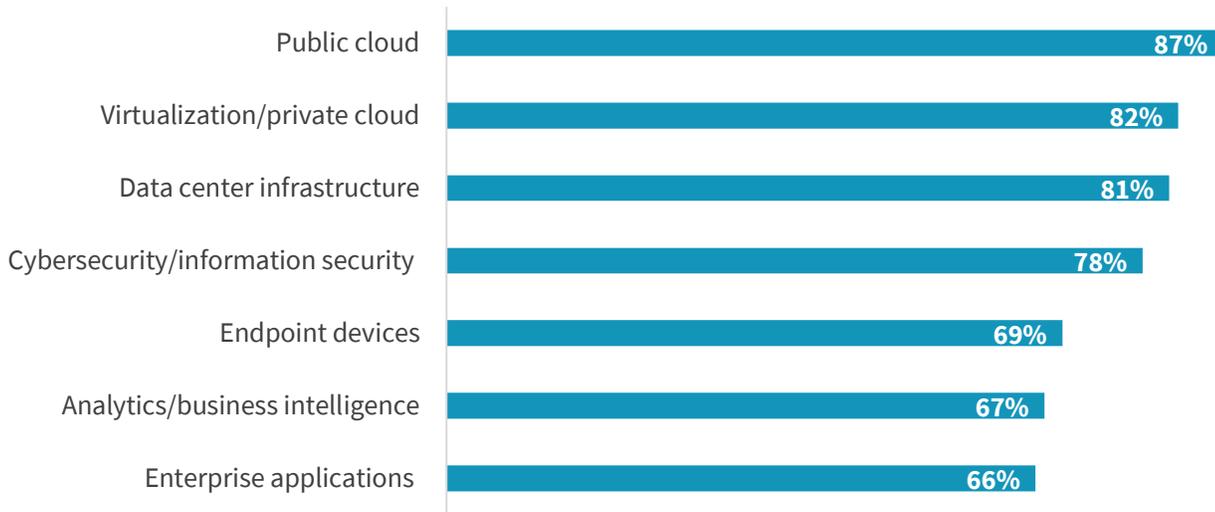
Source: Enterprise Strategy Group

Figure 13. Survey Respondents, by Company Size (Number of Employees)

How many total employees does your organization have worldwide? (Percent of respondents, N=1,257)

- 100 to 249, 4%
- 250 to 499, 7%
- 500 to 999, 16%
- 1,000 to 2,499, 21%
- 2,500 to 4,999, 17%
- 5,000 to 9,999, 14%
- 10,000 to 19,999, 9%
- 20,000 or more, 11%
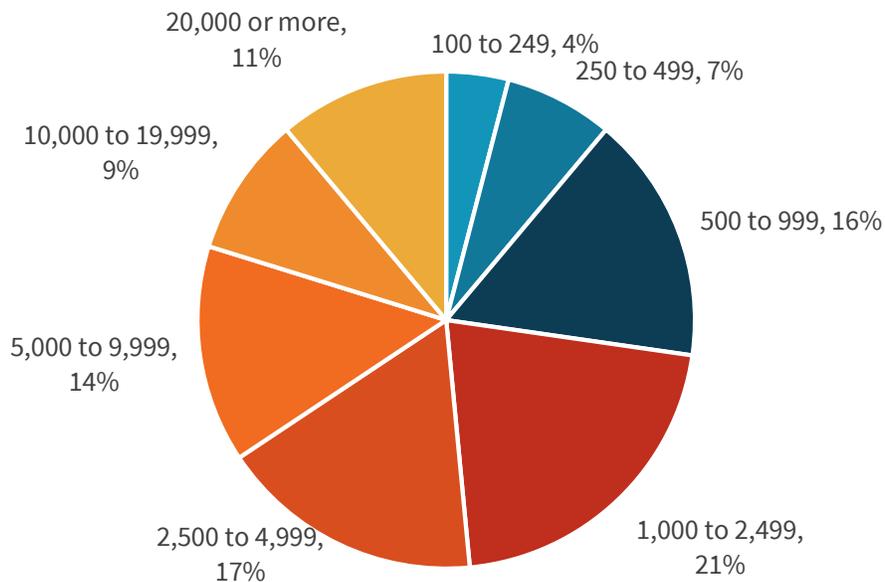
Source: Enterprise Strategy Group

Figure 14. Survey Respondents, by Industry

What is your organization's primary industry? (Percent of respondents, N=1,257)

Source: Enterprise Strategy Group

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